Missouri Department of Natural Resources

MO Risk-Based Corrective Action for Petroleum Storage Tank Sites - Analysis of Petroleum Hydrocarbon Fractions

Hazardous Waste Program technical bulletin 4/2005

What is a petroleum hydrocarbon fraction analysis?

There are many analytical methods for measuring concentrations of petroleum hydrocarbons. None of the methods measure the entire range of petroleum hydrocarbons. Each measure a slightly different subset of the petroleum hydrocarbons present in a sample. Some methods identify and quantify total petroleum hydrocarbons (TPH) as hydrocarbon fractions. These methods break TPH into discrete hydrocarbon fractions providing data that can be used in a risk assessment and in characterizing product type and compositional changes according to the Total Petroleum Hydrocarbon Criteria Working Group Series, Analysis of Petroleum Hydrocarbons in Environmental Media, Vol. 1, March 1998. These are petroleum hydrocarbon fraction analyses.

Under the MO Risk-Based Corrective Action (MRBCA) process, petroleum hydrocarbon fractionation should be by Texas Natural Resource Conservation Commission (TNRCC) Method 1006. This Method is to be used for fractionation of TPH-GRO, DRO, and ORO.

Why should I analyze my samples using a petroleum hydrocarbon fraction analysis?

Under the MRBCA process, toxicity data has been assigned to each of 10 hydrocarbon fractions. The toxicity of the fractions varies. Therefore, the risks associated with a specific site will also vary depending on which fractions are present and at what concentrations. Breaking TPH into fractions therefore allows a more specific and finely tuned assessment of risk.

When can petroleum fraction methods be used?

Under the MRBCA process, petroleum hydrocarbon fractionation is a Tier 3 activity. Before samples are analyzed for the various petroleum fractions, the evaluator must prepare and submit a work plan to the Department of Natural Resources explaining what they intend to do, how they intend to do it, and why. This work plan must be approved by the department before the activities may commence. The work plan requirement ensures that the department is aware of what is being done at a particular site and can ensure that the proposed methodology is acceptable.

What petroleum fractions are measured under the MRBCA process?

Appendix F of the MRBCA guidance document presents further information regarding the assessment of TPH, including, in Table F-1, a list of the TPH fractions. The fractions are as follows:

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Aliphatics: >C6-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, and >C21-C35
Aromatics: >C8-C10, >C10-C12, >C12-C16, >C16-C21, and >C21-C35

Notes pertaining to the February 2004 version of the MRBCA guidance:
The February 2004 version of the MRBCA guidance document, at subsection F.3, states that fractionation should be by Methods 8260 and/or 8270. This is in error. Subsequent to publication of the guidance document, the department learned that fractionation by these methods is not practical.

The use of TNRCC Method 1006 is not approved for individual target analytes evaluated under the MRBCA process and listed in Table 5-1 of the MRBCA guidance document (i.e., BTEXN, EDB, EDC, TPH-GRO, TPH-DRO, TPH-ORO, oxygenates, or PAHs). Individual target analytes shall be analyzed by the analytical methods listed in Table 5-1.

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